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June 2, 2006

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Re: Lamprey/Sturgeon Studies

Dear Erin, Chip, and Eric:

As all parties involved in the Portland Harbor investigation have acknowledged since the beginning of this project, it is important in assessing Portland Harbor contamination to take into account risks to Pacific lamprey and white sturgeon. To this end, the Lower Willamette Group (LWG) identified both lamprey and sturgeon in the Programmatic Work Plan as potential receptors of concern. The LWG recognizes these as important species within the Lower Willamette River ecosystem, and it also recognizes that the Native American Tribes consider both species to be culturally significant.

The following is a summary of work conducted thus far to address lamprey and sturgeon, a summary of recent discussions on the issue, and a proposal for initiating specific sampling and analysis programs aimed at filling specific data needs for the lamprey and sturgeon.

## Lamprey and Sturgeon Work to Date

In the first phases of the RI/FS investigation, the LWG was able to obtain data for adult lamprey and adult sturgeon tissue from the Lower Willamette. In addition, the LWG devoted considerable effort attempting to collect sufficient lamprey ammocoete tissue for analysis. During Round 1, three ammocoetes were collected during boat electroshocking in late August 2002. Following that effort, two reconnaissance surveys were conducted to determine if additional lamprey ammocoetes could be collected in Portland Harbor. For the first survey in September 2002, backpack electroshockers and sediment grabs were used at 21 co-located sediment and tissue sampling locations, resulting in the collection of one ammocoete with the electroshocker. For the second survey in October 2002, fisheries biologists from the Umatilla tribe assisted in targeting habitat considered favorable for ammocoetes and eleven locations were sampled with backpack electroshockers. However, no ammocoetes were found.

Following these efforts, Environmental International, consultant to the Tribes, suggested to the LWG that the environmental staff of the Confederated Tribes of the Warm Springs had expertise in identifying lamprey habitat and that they should be consulted to develop a different approach to the tissue collection effort. In April 2005, Lisa Saban, LWG eco-risk assessor, met with environmental staff from the Warm Springs and with Chris Thompson from Environmental International. Lisa shared with those biologists the procedures that had been utilized by the LWG and, in the last effort, by the LWG and the Umatilla biologists. Although a good discussion was had as to what had been successful thus far, neither the representatives of the Warm Springs nor EI had any different techniques to suggest for the collection efforts.

During the Round 2 tissue collection, a benthic sledge was used to collect benthic invertebrates from 33 stations along the river margins in Portland Harbor in November and December 2005. Only seven ammocoetes were collected in 470 tows. Sediment grabs were also collected as part of this effort from six to seven locations within each of the 33 sledge stations; this effort yielded only three ammocoetes. All together, the Round 2 collection efforts resulted in the collection of approximately 14 grams of lamprey ammocoete tissue, which will be submitted for analysis, albeit limited due to the small sample volume.

Adult lamprey were collected at Willamette Falls in the summer of 2003 through a cooperative effort of the Oregon Department of Human Services (ODHS), Agency for Toxic Substances and Disease Registry (ATSDR), Oregon Department of Fish and Wildlife (ODFW), the City of Portland, and U.S Environmental Protection Agency (EPA) Region 10. Four whole body composite samples, which are representative of human consumption, were analyzed. The LWG has compiled and reviewed the analytical data for adult lamprey and will use these data to assess human health risks from consumption of lamprey.

The LWG has also devoted resources to the assessment of sturgeon. Adult sturgeon were collected in the summer of 2003 through the same cooperative effort that collected the adult lamprey samples. The sturgeon samples were collected between river miles 3.5 and 9.2. Six fillets without skin samples, which are representative of human consumption, were analyzed. The LWG has compiled and reviewed the analytical data for sturgeon and will use these data to assess human health risks from consumption of sturgeon.

**April 26, 2006 Lamprey/Sturgeon 'Summit' Meeting**

The LWG met with the Trustee Council and EPA on April 26, 2006, to specifically discuss further study of both lamprey and sturgeon. At that meeting, representatives of the Trustees presented to the LWG risk team a list of studies relating to lamprey and sturgeon that the Trustees stated they believed would be useful in developing site response and site restoration activities. Following that meeting, the Trustee Council provided to the LWG a paper entitled "Sturgeon and Lamprey Information Issues—Lower Willamette River NPL Site Response & Restoration" which provided a conceptual overview of various questions regarding lamprey and sturgeon that had been developed by the Trustees, and which provided background with respect to the list of possible studies discussed at the meeting.

At the conclusion of the April 26th meeting, the LWG agreed to continue discussions of lamprey and sturgeon through a Technical Team, with a goal of reaching consensus on plans for further study of lamprey and sturgeon. The team includes scientists from NOAA, USFWS, Environment International (consultant to five of the six Tribes), ODFW and technical personnel from the LWG. The team, led by Ron Gouguet from NOAA, has met regularly and is continuing its work to develop a consensus plan. As discussed at the April 26th meeting, the plan may consider both RI/FS data gaps and data gaps with respect to the separate natural resources damages assessment (NRDA), with a goal of developing data collectively, where appropriate. These discussions are following on the heels of the successful effort last

year to coordinate both RI/FS and NRD-focused interests in developing sampling plans for spring-run Chinook juveniles.

**Need to Develop Round 3 Lamprey and Sturgeon Work Plans**

As we have discussed since last fall, in order to complete the Portland Harbor RI/FS in a timely fashion, it is important to identify those data gaps that need to be a focus of Round 3A sampling by early summer 2006. We believe that all parties acknowledge that there are data gaps with respect to our understanding of the risks to lamprey and sturgeon within the Harbor. These were specifically identified as data gaps by EPA in its December 2, 2005 memorandum, and tissue collection of pre-breeding sturgeon was set forth in EPA's February 17, 2006 suggested Scope of Work, with tissue collection of lamprey identified as a subject on which there would be further direction from EPA.

Although the Technical Team has not reached consensus on a complete plan to incorporate both RI/FS and NRD elements, it has had significant discussion of data objectives and potential studies to meet those objectives. Given the importance of developing Round 3A work plans in time for implementation in the late-summer or fall of 2006, the LWG eco-risk team has been attempting to incorporate some of the near-term data needs that have been preliminarily identified by the Technical Team into its RI/FS planning.

We therefore are at a point where we would like to propose, at a conceptual level, those studies that have been discussed by the Technical Team which the LWG believes will adequately address the RI/FS data gaps regarding lamprey and sturgeon. The LWG is making this proposal with great deference to its understanding of the importance of these two species to EPA's Tribal partners. Although it would be possible to make risk management decisions with respect to both of these species using information on surrogate species and applying conservative assumptions, the LWG acknowledges the importance that the Tribal partners place on obtaining actual tissue and of confirming the conservative nature of risk assumptions developed for other species. Because of the importance of these issues to the Tribes, the LWG members are prepared to agree to more extensive assessment of these two species than the assessment being conducted with respect to other species.

Accordingly, the LWG is prepared to develop work plans for the elements described below. These activities represent the studies for which the Technical Team has reached a consensus on the need for, and utility in the RI/FS and the NRDA. Other candidate studies have been discussed in recent Technical Team meetings, but no consensus has been reached on whether the studies can generate specific data useful in the RI/FS or specific enough to make conclusions in the NRDA. The LWG recognizes that additional data may be needed after these elements are completed. However, we believe that neither the need for additional information, nor the specific data needs can be determined until the following information is collected and evaluated. In the context of recent discussions regarding the RI/FS Round 3 fieldwork, the following correspond to Round 3A activities.

- ***Collection of Lamprey Ammocoetes.*** An additional attempt at the collection of lamprey ammocoetes within the Portland Harbor and in an agreed-upon upstream area, using the deep water electroshocking technique that has been used in the Great Lakes. If adequate tissue amounts are collected, then the samples will be analyzed for contaminants of interest (COIs) based on the same priority scheme that has been proposed for the recent juvenile salmonid, clam, and invertebrate tissue analyses. If tissue is not collected, then risk to lamprey ammocoetes will be evaluated using other fish or benthic tissue that is best representative of lamprey ammocoete exposure.

  The LWG believes this study could contribute significantly to the understanding of the distribution, occurrence, and habitat use by ammocoetes in the Lower Willamette River. Therefore, the sampling effort will be conducted systematically in the best candidate habitat types (i.e., based on flow, substrate type, etc.) available in the ISA and upstream of the ISA. The

sampled areas will be characterized based on key habitat features to provide information on the potential distribution and occurrence of ammocoetes in the lower river. The LWG will look to the Tribes and other experts to identify the best candidate locations, and the habitat features to be characterized. In addition, the LWG would like to have Tribal and agency scientists involved in the sampling and handling efforts to make sure that the best expertise is being applied.

- ***Ammocoete Sensitivity Testing.*** Side-by-side toxicity tests will be conducted using lamprey ammocoetes and rainbow trout or other standard test organisms to assess the relative sensitivity of ammocoetes compared to species for which sensitivity to contaminants has been well characterized. As currently proposed by the RI/FS/NRD technical team, the LWG would propose to use 96-hour water exposures in these tests. The information gleaned from these tests will help determine whether or not the existing water quality standards or other screening criteria are protective of the ammocoetes.

- ***Collection of Pre-breeding Sturgeon for Tissue Analysis.*** Sampling for pre-breeding (juvenile) sturgeon will be conducted in the ISA and in appropriate reference areas to assess the relative concentrations of COIs. The LWG agrees with the general goals expressed in recent straw proposals communicated by the agency team. Reflected in those goals is a need for reference areas that are selected to elucidate the concentration of fish from the ISA relative to more regional concentrations. The number of fish, and the specific locations should be determined based on results of ongoing discussions within the Technical Team.

Results of these investigation elements would be used to help determine whether a protective remediation decision is possible, or whether additional information/data collection is needed. If additional information is needed, detailed analysis of data needs will be conducted as part of the Round 3b data needs identification process.

Attached is a decision matrix setting forth the specific RI/FS Data Quality Objectives that will be furthered by these studies. The above proposal is made at this time because of the need to immediately begin development of Round 3A work plans and because the described studies (the first two of which are extremely innovative) will require extensive efforts to develop.

**Continuation of Lamprey/Sturgeon RI/FS/NRD Technical Team Efforts**

The LWG eco-risk team will continue to work with the Technical Team to discuss whether a broader range of studies is necessary to support risk management decisions in the RI/FS and whether RI/FS data collection and analysis programs can further accommodate NRDA needs. We are pleased with the progress the Technical Team is making and will continue to evaluate concepts coming out of that team.

Very truly yours,

Jim McKenna

Bob Wyatt

encl.: Lamprey Sturgeon DQO Table

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| Problem Statement | Inputs to Decision | Data Sources | Decision Rule |
|---|---|---|---|
| Does the exposure to chemicals resulting from historical and ongoing releases and/or sources within the ISA pose unacceptable risks to lamprey ammocoetes and pre-breeding sturgeon[a]? | • Lamprey ammocoete tissue data collected during Round 2 benthic tissue sampling in December 2005.<br>• Tissue data from Round 3 pre-breeding (juvenile) sturgeon[b] and lamprey ammocoetes[c]<br>• Results from limited number of side-by-side toxicity tests[d] with lamprey ammocoetes and rainbow trout to address relative sensitivity of lamprey with other fish species for selected chemicals to determine potential toxicity and/or bioavailability issues.<br>• Lamprey and sturgeon life history and dietary habits information to determine potential exposure area<br>• Apply safety factors to tissue thresholds for specific COPCs if water toxicity studies indicate higher sensitivity in lamprey. | • Toxicity data from Great Lakes sea lamprey water exposure data (USFW: Applegate et al.1957) to establish effect levels (sensitivity) based on tissue<br>• Tissue-based toxicological data from other literature sources to establish effect levels<br>• Surface sediment, surface water, benthic infauna tissue, and fish tissue data collected (or will be collected) in exposure areas<br>• Toxicity results of side-by-side lamprey and rainbow trout toxicity tests | • If COPC tissue concentration using 95$^{th}$ UCL or maximum concentration is > tissue-based NOEC, the COPC will be retained for further evaluation<br>• If COPC surface water concentration is >AWQC or other effects-based criteria, the COPC will be retained for further evaluation<br>• If COPC dietary exposure dose (estimated from tissue and sediment concentrations) is > dietary NOEC, the COPC will be retained for further evaluation |

*Reference*: Applegate VC, Howell JH, Hall AE, Smith MA. 1957. Toxicity of 4,346 chemicals to larval lampreys and fishes. Special scientific report -- Fisheries No. 207. US Department of the Interior, Fish and Wildlife Service, Washington, DC.

[a] Adult lamprey and sturgeon will not be evaluated. The life stages being evaluated are expected to be the most sensitive and protective of adults.

[b] Lamprey ammocoetes will be collected from the Study Area using the Great Lakes technique (i.e., deep water electroshocking). If collection of lamprey ammocoetes is not feasible, other fish tissue that is representative of lamprey will be used, in agreement with EPA and its partners.

[c] Pre-breeding sturgeon will be collected in summer 2006 (and possibly winter 2006, if warranted).

[d] Side-by-side toxicity tests will be 96 hour water only tests.